



STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



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June 22, 2007

Mr. Greg Cochran, Director  
Michigan Dioxin Initiative  
Michigan Operations  
The Dow Chemical Company  
1790 Building Washington Street  
Midland, Michigan 48674

Dear Mr. Cochran:

SUBJECT: Letter Dated May 22, 2007, Regarding *GeoMorph*<sup>TM</sup> Pilot Site Characterization Report, Upper Tittabawassee River and Floodplain Soils (Report) and E-mail Dated May 25, 2007; The Dow Chemical Company, Michigan Operations (Dow); MID 000 724 724

This letter serves two purposes by responding to: (1) the May 22, 2007, letter from Mr. Ben Baker of Dow, which was sent in response to my letter of May 3, 2007; and (2) your e-mail of May 25, 2007, to me on exposure unit sampling of Priority 1 and 2 properties.

*GeoMorph*<sup>TM</sup> Approval

My May 3, 2007, letter granted Dow approval to use the *GeoMorph*<sup>TM</sup> process to complete the site characterization of the balance of the Tittabawassee River study area and the upper portion of the Saginaw River. This approval was conditioned on several limitations and clarifications that were listed in that letter.

As you are aware, in order to facilitate approval of the *GeoMorph*<sup>TM</sup> process for use during this field season, the Michigan Department of Environmental Quality (MDEQ) focused on four unresolved core components that the MDEQ considered critical for approval. Mr. Baker's letter of May 22, 2007, indicated that Dow does not consider the use of the rapid turn dioxin analysis 1613-TRP/RT methodology or the comparability study, the geochemistry study, or the interim response activity/pilot corrective action plan (IRA/PCAP) process to be part of the *GeoMorph*<sup>TM</sup> process, but rather part of the site characterization component of the Tittabawassee River and Floodplain Remedial Investigation Work Plan (RIWP). The MDEQ disagrees.

The effective and efficient implementation of the *GeoMorph*<sup>TM</sup> process is critically dependent upon the near real time delivery of accurate analytical results. Therefore, Dow was required to demonstrate that the 1613-TRP/RT methodology produced reliable results in advance of approving the use of the same methodology for the balance of the *GeoMorph*<sup>TM</sup>-based investigation. The understanding of the fate, transport, and deposition of contaminated media has been improved, and will be further improved, by the geochemistry work required as a component of the May 3, 2007, approval (see Section 5.1.3 – Sediment Geochemistry, of the *GeoMorph*<sup>TM</sup> Sampling and Analysis Plan, July 7, 2006). The IRA/PCAP process provides a process to initiate additional investigation as part of the *GeoMorph*<sup>TM</sup> process to determine if IRAs are required in advance of the implementation of a final remedy.

The MDEQ does agree that the above core components will also become part of the RIWP once that document has been revised by Dow and approved by the MDEQ. The MDEQ and Dow have prioritized work on the site characterization component of the RIWP to occur in July, after completion and approval of the Middle Tittabawassee River Sampling and Analysis Plan (MTR SAP). At this time the RIWP has not been approved, pending the submittal of revisions in response to deficiencies identified during the series of working sessions held during the spring of 2007 and resolution of the human health risk assessment and ecological risk assessment placeholders. The MDEQ anticipates modifying and approving enforceable compliance schedules for the Tittabawassee River and Floodplain and Midland Area Soils RIWPs by July 20, 2007. The MDEQ also expects to grant a partial approval of the site characterization aspects of the RIWP later this summer, which is consistent with our prioritization of this year's work. As a result, the characterization of the middle 11 miles of the Tittabawassee River will not be delayed.

#### Exposure Unit Sampling - Priority 1 and 2 Properties

With respect to the need for additional statistical information, this core issue is addressed in my May 24, 2007, e-mail to you (enclosed). We also discussed the importance of this issue and the practicability of the associated sampling during a meeting on June 7, 2007. Consistent with that discussion, the MDEQ will require practicable, but statistically-based, exposure unit characterization at a number of Priority 1 and Priority 2 properties to validate and compare the *GeoMorph*<sup>TM</sup> level of characterization to the exposure unit level of characterization required at other sites of environmental contamination in Michigan. As noted in my May 24, 2007, e-mail, the MDEQ anticipates this will be done using one or more of the strategies laid out in the MDEQ's Statistical Sampling Strategies Training Manual (S3TM). This has been the MDEQ's understanding based on discussions with Dow over the past year, and we are disappointed that it appears to be emerging as an issue of contention. We do, however, agree with your suggestion to address this issue on a technical basis after the initial *GeoMorph*<sup>TM</sup>-based sampling has been completed.

#### Supplementing the "Rapid Turn" Method with 1613B Analyses

The May 22, 2007, letter from Mr. Baker indicates that Dow disagrees with the MDEQ's summary of the resolution/clarification of this issue. The MDEQ has reviewed our notes and believes that the May 3, 2007, letter accurately reflects our discussions and agreements with Dow on this issue. We do note in the May 3, 2007, letter that the "frequency of additional analyses will be agreed on during the development of the Middle Tittabawassee River Sampling and Analysis Plan." Therefore, we believe there is an adequate mechanism to resolve any remaining disagreements with respect to this issue.

#### Additional Geochemistry Work

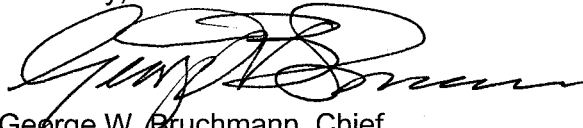
With respect to the "additional geochemistry" concern posed in the Dow letter of May 22, 2007, the MDEQ is not asserting that there was prior agreement on the timing of additional geochemistry work. Further, the MDEQ did not agree to address this issue after the approval of the MTR SAP. The MDEQ has specified as a condition of approval that additional geochemistry work be completed and submitted by the end of August 2007. This is necessary so that the additional information can be taken into account during the implementation of the MTR SAP. As we have stated previously, the MDEQ will work with Dow to identify a reasonable number of samples for additional work on a time frame that will allow delivery of the supplemental geochemistry work by the end of August 2007.

In-Channel Characterization

With respect to the "in-channel characterization" issue raised in Dow's letter, the MDEQ agrees that Dow has provided sufficient information in "working draft" form to allow Dow to proceed with the in-channel characterization on Reaches L, M, and N. The finalized "in-channel" work plan will be provided as part of the MTR SAP.

Should you have questions regarding this clarification, please contact Mr. Allan Taylor, Hazardous Waste Section (HWS), WHMD, at 517-335-4799 or by e-mail at [taylorab@michigan.gov](mailto:taylorab@michigan.gov); Ms. De Montgomery, HWS, WHMD, at 517-373-7973 or by e-mail at [montgomeryd@michigan.gov](mailto:montgomeryd@michigan.gov); or you may contact me.

Sincerely,



George W. Bruchmann, Chief  
Waste and Hazardous Materials Division  
517-373-9523

Enclosure

cc: Mr. Ben Baker, Dow  
Mr. David Gustafson, Dow  
Ms. Margaret M. Guerriero, U.S. Environmental Protection Agency, Region 5  
Mr. Gerald Phillips, U.S. Environmental Protection Agency, Region 5  
Mr. Greg Rudloff, U.S. Environmental Protection Agency, Region 5  
Mr. Jim Sygo, Deputy Director, MDEQ  
Ms. Liane Shekter Smith, MDEQ  
Ms. De Montgomery, MDEQ  
Ms. Cheryl Howe, MDEQ  
Mr. Allan Taylor, MDEQ  
Off-Site Corrective Action File

**From:** George Bruchmann  
**To:** ggcochran@dow.com  
**Date:** 5/24/2007 4:23:07 PM  
**Subject:** Issue of Concern Regarding Exposure Unit Sampling - Priority 1 and 2 Properties

Greg,

To follow up on our discussion yesterday, I wanted to review the background on the Priority 1 and 2 statistically based sampling issue that we have been discussing with Dow over the last year. Prior to meetings conducted on Tuesday and Wednesday of this week, the MDEQ had the understanding that there was agreement on this core technical issue which is addressed in Section 9.1.13 of the December 1, 2006, Remedial Investigation Work Plan (excerpted page attached).

As you are aware, the MDEQ and Dow have committed to a path forward for approval of the RIWP that utilizes "placeholders" for key unresolved sections (e.g., HHRA, ERA) and an interactive review process that will allow revision and approval of the RIWP in a more efficient manner.

The issue of exposure unit level sampling on Priority 1 and 2 properties was collaboratively addressed during the development of this section of the RIWP. The concept discussed and previously agreed to is that some "exposure unit" level sampling would be done at Priority 1 and Priority 2 properties after the initial GeoMorph-based characterization is completed. We continue to believe that GeoMorph does a good job at predicting ranges of concentrations on specific "geomorphic surfaces" but we need to make sure that it gives adequate information at the "exposure unit" level - especially where people are living and/or farming.

The GeoMorph process would be used to determine where Priority 1 and 2 properties may reasonably be above the applicable criteria. A subset of these properties would be selected and more detailed exposure unit based sampling would be conducted using one or more of the strategies laid out in the MDEQ's Statistical Sampling Strategies Training Manual guidance document. In this way we can tie the GeoMorph process to the more standard process for evaluation of concentrations and exposure under Parts 201 and 111 (e.g., at a house on a 1/4 acre parcel). This process to link GeoMorph to the standard exposure unit evaluation, which is how the MDEQ routinely applies cleanup criteria, and is necessary to firmly support our technical and regulatory decisions on the land uses of highest concern - especially on a highly visible project which is likely to be precedent setting for the MDEQ. We see this work as a key component of our approval of the GeoMorph process and consistent with prior agreements for use of the GeoMorph process on areas where we are most concerned about exposure.

This is also consistent with our May 3, 2007, approval letter you on the GeoMorph process which states, in part:

"The MDEQ continues to reserve the right to require additional sampling, as necessary, to refine the understanding of the distribution of contamination in and between the identified depositional units (geomorphic surfaces). As with conventional site investigation techniques, the need to conduct additional sampling will be based, in a large part, on reasonable predictions of future land use and the level of certainty required for remedial decision-making."

Based on our conversation yesterday, I believe that it is possible that there is simply a communication problem related to this issue and that Dow and the MDEQ remain in agreement on this issue. However, because this is a core component of the MDEQ's approval of the GeoMorph process, we believe it is necessary to clarify, and hopefully resolve, this issue immediately.

I look forward to further discussion with you on this issue either tomorrow (before or after the staff-level meeting among Dow, Water Bureau, and WHMD to discuss the additional characterization data and NPDES issues related to the Reach D PCAP/IRA) or next week if tomorrow is not workable.

Thank you,

George Bruchmann, Chief  
Waste & Hazardous Materials Division  
Michigan Department of Environmental Quality  
tel.: 517.373.9523; fax: 517.373.4797;  
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**CC:** Allan Taylor; Ben Baker; Cheryl Howe; Deborah Mackenzie-Taylor; Delores Montgomery; dgustafson@dow.com; Jim Sygo

#### **9.1.13 SAP Development for Tittabawassee River and Priority I and II Properties**

In early 2007, a *GeoMorph*<sup>®</sup> SAP will be prepared for the Middle and Lower Tittabawassee River based on the geomorphic mapping that will be conducted in late 2006. As with the UTR SAP, the lower portions of the Tittabawassee River will be divided into a series of reaches based on the geomorphology and anthropogenic influences along the river. Sampling locations within each reach will be developed in consultation with MDEQ along a sufficient number of transects to define the nature and extent of COI contamination in each of the geomorphological features. As with the UTR SAP, the order of the reach sampling sequence will depend on a variety of factors including the characteristics of the reaches, obtaining access, and the nature of the equipment needed to acquire samples to the necessary depth to define the vertical extent of COI contamination.

During the collaborative development of the SAP, special consideration will be given to sampling reaches containing the Priority I and Priority II residential properties defined in the 2005 Framework Agreement such that these samples will be obtained during 2007. As part of this process, statistical sampling will be conducted to evaluate the representativeness of the *GeoMorph*<sup>®</sup> site characterization for establishing exposure point concentrations.

#### **9.1.14 Prioritization of UTR Areas With Erosion Risk Using Pilot Corrective Actions Matrix**

A Pilot Corrective Actions Matrix (Attachment K) has been developed to assist in organizing and evaluating the multiple environmental aspects of a given area found to contain high levels of COIs and which is at risk of erosion and downstream transport and deposition. In addition, the Pilot Corrective Actions Matrix will include information on the presence of endangered or threatened species and/or sensitive habitat in the vicinity of the area of interest. The Dow consulting team will use this matrix in consultation with MDEQ and USEPA by the end of 2006 to identify areas in the UTR that require pilot projects on selected corrective action strategies to mitigate the risk of erosion and downstream transport of COIs.

#### **9.1.15 Development and Preliminary Screening of Short and Long Term Corrective Action Technologies for Areas With High Risk of Erosion in UTR**

Throughout 2006, Dow's consultants have been evaluating alternative corrective action technologies to abate, manage or eliminate the risks posed by COIs in the overbank of the Tittabawassee River. The evaluation process is ongoing as of this writing as information becomes available from the UTR SAP